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(54) **Apparatus for Metered Feed of Dust-like Particles**

(57) An apparatus for feeding dust-like particles is described. According to the invention a rotatable metering disc is provided with recesses from which the dust-like particles being fed are removed by means of a compressed air-driven injector.

Claims

1. Apparatus for metered feed of dust-like particles with a material container, a vibrator and an injector driven by compressed air, characterized by the fact that a rotatable metering disc (9) is provided with recesses (16), which are connected to a lateral slit-like recess (18) in the metering disc and the injector (13) and that a scraper (19) is arranged on the surface of the metering disc.
2. Apparatus according to Claim 1, characterized by the fact that the metering disc (9) is arranged obliquely.
3. Apparatus according to Claims 1 and 2, characterized by the fact that the metering disc (9) can be driven at different speeds.
4. Apparatus according to Claims 1 to 3, characterized by the fact that the recesses (16) are provided in the peripheral region (11) of metering disc (9).
5. Apparatus according to Claims 1 to 4, characterized by the fact that the recesses (16) are designed as flat, circular holes (17).
6. Apparatus according to Claim 5, characterized by the fact that the recesses (17) have different diameter and/or different depth depending on the size of the dust particles being conveyed.
7. Apparatus according to Claims 1 to 6, characterized by the fact that the metering disc (9) consists of two flat plates, in which the upper plate has grooves, whereas the lower plate is offset in annular fashion in the outer peripheral region so that a lateral annular groove is formed with the upper plate that is connected to the recesses.
8. Apparatus according to Claim 1, characterized by the fact that the scraper (19) is designed knife-like, for example, as a metal plate.
9. Apparatus according to Claims 1 to 8, characterized by the fact that the vibrator (7) is arranged adjustable between metering disc (9) and outlet (4) of the material vessel (1).
10. Apparatus according to Claims 1 to 9, characterized by the fact that porous passages (5) through which heated compressed air (6) can be fed are provided on the material vessel (1), preferably on the conical outlet section (3).

Description

The invention concerns an apparatus for metered supply of dust-like particles with a material vessel, a vibrator and an injector driven by compressed air.

A known variant of a dust generator consists of a material vessel with agitator. Beneath the outlet of the material vessel a vibrator with a vibrating disc adjustable in spacing is provided, which is connected via a rubber bellows to a metering container. The gap width between the material vessel and the metering container can be adjusted by height adjustment. Partial vacuum prevails in the metering container because of the injector mounted beneath it so that a nonmeasurable amount of circulating air is drawn over the metering container. This amount of air is directed toward the corresponding material deposit in the injector, equalization bellows and metering container, which leads to sharp variations in metering. The amount of material can be set via the gap width and amplitude of the oscillator. The compressed air is fed through the injector with an injector nozzle with the drawn in circulating air from processing, for example, of an inhalation. The emerging stream of compressed air entrains the material on the injector nozzle. Undesired agglomerates can then form. The material vessel, motor with agitator, vibrator and metering container are fastened to a frame. During a change in material, the material-guiding parts only connected to the heavy frame are to be cleaned, since these are screwed to the frame. The known design is also laid out only for large amounts of material. Limited meterings, especially as desired during spraying and dusting, are not possible with the known system.

The underlying task of the invention is to devise an apparatus for metered supply of dust-like particles in which the mentioned drawbacks are avoided, low metered amounts are conveyable and the formation of agglomerates is suppressed.

The task is solved according to the invention in that a rotatable metering disc is provided with recesses that are connected to a lateral slit-like recess in the metering disc and to the injector and that a scraper is arranged on the surface of the metering disc. Material falls from the material vessel via the vibrator into recesses which can be conveyed to processing via a line arranged on the injector. The amounts to be conveyed can be precisely established on this account.

In order for as little material as possible to remain on the surface of the metering disc, the metering disc is advantageously arranged obliquely and can be driven with different speeds.

The recesses are expediently provided in the peripheral region of the metering disc and designed as flat, circular holes. They have different diameter and different depth, depending on the size of the dust particles being conveyed so that precise amounts can be set.

An advantageous alternative variant of the metering disc consists of the fact that it comprising two plates, in which the upper plate has the recesses, whereas the lower plate is offset in annular fashion in the outer peripheral region so that a lateral annular groove is formed with the upper plate that is connected to the recesses.

In order to remove amounts of material occurring on the surface of the metering disc, it is advantageous if the scraper is designed knife-like, for example, as a blade-like metal plate.

The vibrator can be arranged adjustable between the metering disc and the outlet of the material vessel. To avoid agglomerates, porous passages through which heated compressed air can be fed are expediently provided on the material vessel, preferably on the conical outlet section.

Additional objectives, features and advantages follow from the subsequent description of practical examples with reference to the drawings. All described and/or depicted features alone or in any reasonable combination form the object of the present invention, also regardless of their summary in the claims or their referencing.

In the drawing:

Fig. 1 shows a schematic view of a practical example of the apparatus according to the invention. Figures 2 and 3 show views of the metering disc provided with different recesses of the practical example according to the invention, and

Fig. 4 shows a sectional view of a metering disc according to Fig. 2 or Fig. 3.

The practical example schematically depicted in Fig. 1 shows a material vessel (1) with an agitator (2) and a conical tapering (3) to which the outlet opening (4) is connected. Porous passages (5) are provided on the conical tapering (3), through which heated compressed air (6) can be introduced into material vessel (1) in the direction of the arrow during operation. The dust-like particles being conveyed are kept in a dry and loose state on this account and avoid agglomerates.

A vibrator (7) with an outlet (8) is arranged beneath outlet opening (4), whose spacing (A) is adjustable, for example, by means of a micrometer screw (not shown). Course metering of the desired feed amount can be carried out with this.

Precise metering occurs with a metering disc (9) arranged beneath it, which is driven by a motor (10), if desired, with different speeds. The outlet (8) of vibrator (7) is then situated above the peripheral region (11) of the metering disc. An injector (13) operating with compressed air (12) is also arranged in the peripheral region (11) radially displaced, whose receiving opening (14) acting as a vacuum is held at a limited distance to the surface of the metering disc (9). The transport line (15), which leads to a processing station, for example, an inhalation remover or a mixing container, is connected to injector (13).

The metering disc (9) has recesses (16) in its peripheral region (11) (Figures 1 and 3), which can be designed as blind holes (17) of different diameter and different depth in varying number. The blind holes (17) are connected to a lateral slit (18). During operation, the injector (13) draws in air from the atmosphere via slit (18). The desired metered amounts can be precisely established by the size of recesses (16). Material (B) lying on the surface of metering disc (9) is removed by a knife-like scraper (19) and can fall into a receiving vessel (20).

The metering disc (9) is not limited in design to the described and depicted practical example. It can also consist according to the invention in modified form of two disc-like plates (not shown), in which the upper plate has the recesses that determine the metered amounts and the lower plate has an annular flange on the periphery, which serves as slit for intake of outside air.

The dust-like particles are drawn in by means of outside air from the recesses by the injector and conveyed by the compressed air driving the injector. Expediently, this compressed air should also be heated and passed through an air filter.

Reference List

- 1 Material vessel
- 2 Agitator
- 3 Tapering
- 4 Outlet opening
- 5 Passages
- 6 Compressed air
- 7 Vibrator
- 8 Outlet
- 9 Metering disc
- 10 Motor
- 11 Peripheral region
- 12 Compressed air
- 13 Injector
- 14 Receiving opening
- 15 Transport line
- 16 Recess
- 17 Blind holes
- 18 Slit
- 19 Scraper
- 20 Receiving vessel

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.